Alert and Warning
Report to the California State Legislature

Fulfilling the requirements of AB 2231 (Pavley)
Section 5393.6 of the government code

Providing a framework for a public-private partnership to enhance public access to emergency alerts and warnings.

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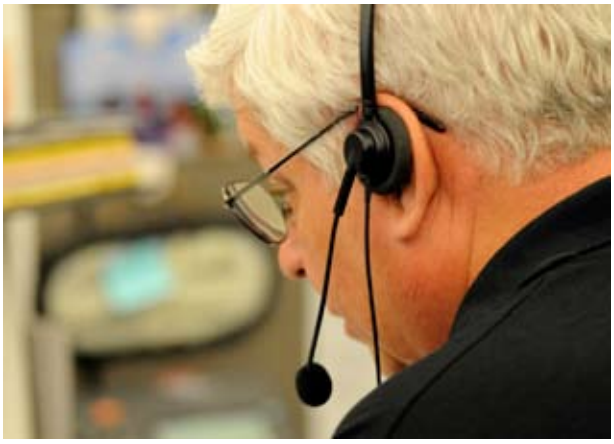
Executive Summary 1

This report has been prepared as required by Assembly Bill 2231 (Pavley, Government Code Section 8593.6). The legislation required that the Office of Emergency Services (OES) convene a Working Group and through a public-private partnership provide advice to the OES director on development of policies and procedures that "will lay the framework for an improved warning system for the public.

Emergency alerts and warnings are issued to the public to draw their attention to an immediate hazard and to encourage them to take a specific action in response to an emergency, disaster event, or threat of a disaster. In California, the vast majority of emergency warnings are issued by local governments. Warnings are issued by a local government in response to a wide variety of disaster or potential disaster events that may impact persons residing, working, or visiting in that jurisdiction. Selection of the means for issuing warnings has been a local decision, generally based on the hazards faced by and disaster history of the jurisdiction, and vary in technical complexity. Throughout California, many methods are used and generally, these local systems are not interconnected between neighboring jurisdictions.

There has been considerable academic research on public response to alerts and warnings. The elements of the warning message are key in influencing the public to take the proper response:

- The message should come through multiple, diverse channels;
- The more a warning message is repeated and heard the better;
- The content should include who is making the recommendation, who should follow the recommendation, why they should do it, what they should do, and when they should do it;
- The message style should be clear, specific, accurate, certain, and consistent;
- The warning should come from a credible source, and credibility may vary among elements of the population to be warned.



Most recipients will want to validate the information before taking action. In order to take appropriate action in response to an alert, the public must understand the warning process. Therefore, a comprehensive public education program is an essential part of an effective alert and warning system.

There are several on-going alert and warning initiatives at the national level, with which California's alert and warning efforts must coordinate:

- Migration to a Common Alerting Protocol (CAP), which is "a single message format with the essential features to handle existing and emerging alert systems and sensor technologies"
- Development of the Commercial Mobile Alert System (CMAS), a system by which mobile service (e.g., cellular telephone) providers will relay authenticated emergency messages and alerts to their mobile device customers.
- Maintenance and improvement of the Emergency Alert System (EAS), which relies on broadcast television and radio and the NOAA Weather Radio Network to transmit emergency information.
- Integrated Public Alert Warning System (IPAWS), an initiative of the Federal Emergency Management Agency to integrate warning systems to allow the President and authorized officials to effectively address and warn the public and State and local emergency operations centers via a range of communications devices

The need to issue a state-wide alert in California is extremely rare. Nonetheless, there are several tools available statewide to assist local agencies with the issuance of public warnings. In particular, the Emergency Digital Information Service (EDIS) is a "state operated public warning system that links emergency managers to the news media, public, and other agencies". EDIS is a "backbone" or integration system, allowing messages generated by authorized agencies throughout the state to be distributed to areas in California that need to receive the warning. EDIS can also potentially serve as a "subaggregator" under CMAS.

Most public warnings are issued by local governments. They have been particularly applied when protective actions – evacuations or sheltering in place – are required. Local responsibilities for how warnings are issued, and who is responsible for doing so, are outlined in local Emergency Operations Plans and supporting procedures. At the local government level, alert and warning options are varied and have mixed capabilities. Many jurisdictions have invested in auto-dial telephonic emergency notification systems. Through these systems, a message is automatically sent to landline telephones identified as being within the warning target area and can also be sent to other devices in the warning area, such as TTY and mobile devices, if the customer registers those numbers with the local jurisdiction. The majority of these systems are operated and supported by third party vendors. Some jurisdictions continue to use outdoor siren systems. Many rely on the EAS. This mix of local alert and warning notification methods presents many challenges.

The Statewide Alert and Warning System, including both the issued warning and sources available to validate the warning, must be accessible to people with diverse disabilities. In order for alert and warning systems to effectively reach people with disabilities, the systems should employ a variety of communications methods and multiple formats that are accessible to the targeted population. This may include the need to use emergency notification registries, which have both advantages and limitations. Further development of the Statewide Alert and Warning System must include representatives of the diverse groups of disability from the community.

Development of this report included identification of issues in development, implementation, and maintenance of a Statewide Alert and Warning System. These issues are detailed in Section 5.

This report makes the following recommendations for future work efforts to enhance public access to alerts and warnings[1] in a rapidly changing technical and regulatory environment:

Structuring California's Statewide Alert and Warning System

- The Statewide Alert and Warning System must be consistent with the Common Alerting Protocol (CAP) as this is essential in assuring interoperability, ensuring adaptability to new technologies, and creating a "system of systems".
- California's Statewide Alert and Warning System should be a standardized structure that is implemented locally. The state should maintain the statewide alert and warning system structure. Local agencies should be responsible for maintenance of their systems that tie into the statewide public warning system.
- California's Emergency Digital Information Service (EDIS) should be used as the backbone of the Statewide Alert and Warning System including the integration of EDIS into the Alert Aggregator function.
- The Governor's Office of Emergency Services [(OES, as of January 1, 2009, the California Emergency Management Agency)] should be given the responsibility and budgetary support necessary to maintain and manage EDIS, including necessary upgrades to maintain consistency with emerging federal alert and warning initiatives.
- Although Commercial Mobile Alert System (CMAS), the federal cellular notification system initiative, has not been fully implemented, the state should not develop its own cellular notification system in the mean time but should actively participate in CMAS' further development and integrating EDIS into the CMAS aggregation architecture.
- The Statewide Alert and Warning System should be clearly explained in the State Emergency Plan.

1 This report focuses on the issuance or alerts and warnings to California's public; it does not address emergency notification of emergency responders or transmission of alerts between levels of government.

System Governance and Maintenance

- A California Public/Private Partnership for Alert and Warning (Partnership) should be created as the basis of a formal governance structure for the Statewide Alert and Warning System. The objective of the Partnership should be ongoing support of and accountability for a seamless, integrated standards-based public warning capability. Membership must include local and state agencies, representatives of all types of commercial communications networks, and disability community representatives.
- Common "standards of practice", both for when warnings are issued and how they are issued, should be developed.
- Procedures and protocols for coordinating and reconciling alerts and warnings that impact multiple local jurisdictions should be developed.
- Crafting the Warning Message
- Templates should be developed for common warning situations and should be based on academic research on successful warning messages.
- Message templates should be crafted or translated to meet the particular needs of California's diverse populations to the extent feasible.
- Minimum performance standards for automated translation technology should be defined.

Alert and Warning Technology

- The Statewide Alert and Warning System must be able to deliver a single message to various recipients through various media. These various media must be virtually equivalent to each other from the message input perspective (i.e. "plug and play"), while acknowledging the technical characteristics and limitations of the various media, so that the operational processes for the message issuer do not change whether the message is sent to mobile devices, computers, landline phones, or whatever communications technologies arise in the future.
- The alert and warning system adopted by the state must be flexible enough to adapt to, not preclude, future changes. System governance must include on-going evaluation and continuous improvement.
- Similarly, the alert and warning system adopted by the state must be flexible enough to adapt to various alert and warning technologies already in use by local government.
- The alert and warning system should strive to reach all phones and devices that are in use by humans within a particular area at the particular time the warning is issued, whether wired or wireless and without regard to the area code of the number, and without resulting in significant impacts to the telecommunications infrastructure (i.e., ability to make 9-1-1 calls).
- Access to proprietary information on mobile, Voice over Internet Protocol, and other non-landline personal devices may be needed, but must be obtained in such a way as to protect companies and customers against unauthorized system access or use of customer data. This may require federal action.
- The Statewide Alert and Warning System must incorporate redundancy to reach different recipient groups under various emergency scenarios.

Alert and Warning Accessibility

- Sensory disability learning preference research needs to be built into alert and warning system solutions that can take a single message and translate it accurately to multiple methods of communication used by people with disabilities.
- Agencies procuring local warning systems need to test them through an inclusive process of the diverse disability groups, for this access prior to any commitment to purchase vendor products or services. Standards or guidelines should also be developed to assist communities with this assessment.

Legal/Liability

- There is a need for "Good Samaritan" protection for those that issue or relay a legitimate warning. Communications carriers transmitting a warning from an authorized government representative to the public in an impact area must be protected from liability. However, liability limitations for all parties issuing and delivering alert and warning messages must be contingent on compliance with operational standards.
- The governance structure should provide tools for local agencies use in evaluating, procuring, and implementing emergency notification vendor products.
- Funding
- A secure, dedicated source of funding is required for EDIS and to support the governance system.

Evaluation

- Standards, guidelines, or targets for various elements of the warning system should be established where they do not currently exist.
- A process should be established to gather and evaluate information regarding the use of the Statewide Alert and Warning System and use that information for continuous system improvement.

Training, Credentialing, and Identity Management

- Standardized alert and warning training tied to and consistent with the Standardized Emergency Management System and the National Incident Management System should be developed. Training needs to address creation of the message as well as use of the system, and should include provisions for periodic refresher training.
- Standards or guidelines should be developed for identification, validation, and credentialing of authorized alert and warning system users (message originators and distributors).
- Standards should be set for testing of alerting and warning systems.

Public Education

- An effective public education campaign that reaches all communities including California's most vulnerable populations – including the what, where, when, who, why, and how alerts are issued, the limits of public warning capabilities, and appropriate responses to warning messages – should be part of the Statewide Alert and Warning System.
- Training on alerts and warnings (and on emergency preparedness in general) should be required in all public and private K -12 and higher education institutions in California, and materials should be made available that allow educators to integrate this element into their existing curricula. Material should be locally developed to most accurately reflect local alert and warning procedures.
- Public education efforts should promote realistic expectations about post-event communications, including the importance of using telephones (landline and wireless) only for essential calls.

Integration of Warning with Emergency Public Information Systems and Information Resources

- Procedures and protocols for implementing the alert and warning system should address the need to follow-up alerts with emergency public information to provide supplemental/updated information and articulate the transition from "warning" to emergency public information.
- Guidelines for provision of warning information to the families of first responders should be developed and should emphasize interactive communication – both to the families and feedback to the responders that their families have received the warning and are taking appropriate action.

2 Report Purpose and Scope

This report has been prepared as required by Assembly Bill 2231 (Pavley, Government Code Section 8593.6). The legislation required that the Office of Emergency Services (OES) convene a Working Group "to develop policies and procedures that will provide a framework for instituting a public-private partnership with providers of mass communications systems to enhance public access to emergency alerts." The Working Group was also tasked with "assessing existing and future technologies available in the public and private sectors for the expansion of transmission of emergency alerts to the public" and through a public-private partnership provide advice to the OES director on development of policies and procedures that "will lay the framework for an improved warning system for the public.

Specifically, the statute requires the Working Group to consider and make recommendations with respect to all of the following:

- Private and public programs, including pilot projects that attempt to integrate a public-private partnership to expand an alert system.
- Protocols, including formats, source or originator identification, threat severity, hazard description, and response requirements or recommendations, for alerts to be transmitted via an alert system that ensures that alerts are capable of being utilized across the broadest variety of communication technologies, at state and local levels.
- Protocols and guidelines to prioritize assurance of the greatest level of interoperability for first responders and families of first responders.
- Liability issues.
- Procedures for verifying, initiating, modifying, and canceling alerts transmitted via an alert system.
- Guidelines for the technical capabilities of an alert system.
- Guidelines for technical capability that provides for the priority transmission of alerts.
- Guidelines for other capabilities of an alert system.
- Standards for equipment and technologies used by an alert system.
- Cost estimates.
- Standards and protocols in accordance with, or in anticipation of, Federal Communications Commission requirements and federal statutes or regulations.

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3 Alert and Warning Background

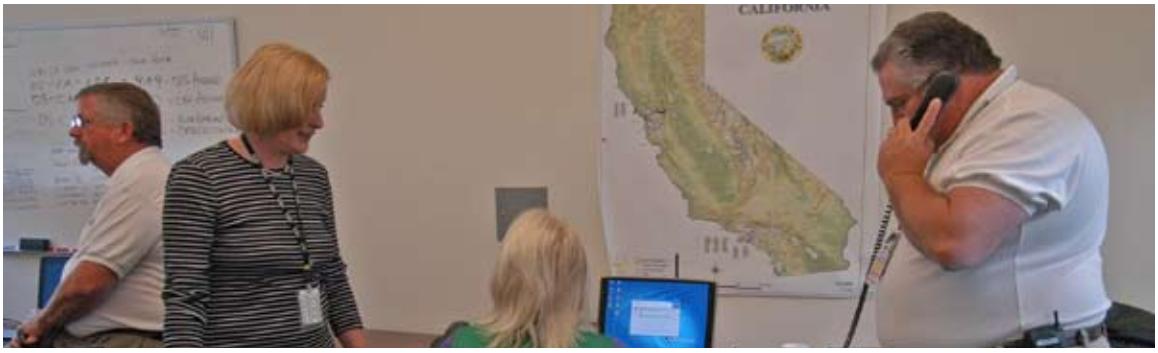
"Timely and effective public warnings can save lives, reduce property losses and speed economic recovery. Public warning empowers citizens by providing them with the information they need during times of emergency to make informed decisions. The objective of a public warning system is to capture the attention of people at risk, to provide them with relevant and accurate information regarding the nature of the threat and to provide such information in time for protective actions to be taken. A truly effective public warning system will reach those at risk regardless of their location, time of day or night, or any disabilities or special needs."

Partnership for Public Warning[2] , **Protecting America's Communities**, June 2004

Emergency alerts and warnings are issued to the public to encourage them to take a specific action in response to a disaster event or a threat of a disaster. In California, the vast majority of emergency alerts and warnings are issued by two primary sources: local governments and the National Weather Service (NWS). Alerts and warnings are issued by the NWS when a damaging weather event is imminent and are generally transmitted by way of the Emergency Alert System (EAS) and, where available National Oceanic and Atmospheric Administration (NOAA) Weather Radio.

Alerts and warnings are issued by a local government in response to a wide variety of disaster or potential disaster events that may impact persons residing, working, or visiting in that jurisdiction. Alerts and warnings may be targeted to the community at large or to a subset of the jurisdiction, such as the neighborhood adjacent to a refinery or those within several blocks of the coast. Selection of the means for issuing alerts and warnings has been a local decision, generally based on the hazards faced by and disaster history of the jurisdiction, and vary in technical complexity. Throughout California, many methods are used – such as automatic telephone dialing systems, sirens, EAS, announcements made by bullhorn from law enforcement vehicles, and going door-to-door. Generally, these local systems are not interconnected between neighboring jurisdictions.

2 The Partnership for Public Warning is a not-for-profit, national public-private partnership established to provide a forum to develop and share information related to public warnings.



Regardless of the method used, the process of issuing a public alert or warning includes several key elements:

- Evaluating the emergency situation and identifying/assessing the risk.
- Deciding to issue a warning.
- Crafting the warning message.
- Disseminating the warning.
- Validating the warning.
- Taking action on the warning.

Policies and procedures for alert and warning, including guidelines for when an alert and warning should be issued and who is able to issue an alert and warning, need to be developed ahead of time and included in jurisdiction Emergency Operations Plans. The public must also be educated about available alerting and warning systems and the appropriate action to take when a warning is received. Alerting systems must also be tested regularly and tests evaluated to provide feedback for system improvements. [3]

It is important to differentiate "alert and warning" from "public information". If necessitated by the incident, making a recommendation to the incident commander/emergency manager regarding issuance of an alert and warning is a function of the operations section of incident management. Issuing an alert and warning is an initial response action, requiring rapid decision-making, often in an environment of uncertainty. For example, calling for an evacuation as a result of a hazardous materials release will require activation of the local alert system before the incident public information officer structure is in place. The alert and warning will often refer recipients to public information sources (such as media releases, Internet postings) for follow-up information. This differentiation of function must be reflected in operation and maintenance of the alert and warning system, including governance, training, and credentialing.

There has been considerable academic research on public response to alerts and warnings.[4] There are several "myths" related to public reaction to warnings, which have been disproven in the academic research:

- "Panic" – in fact, people do not generally panic in response to warnings, particularly well worded warnings,
- "Keep it simple" – actually, recipients want a lot of accurate information in the warning message, if not, they will search for it from other sources, and
- "False alarms" -- while an adequately explained false alarm may not deter future desired behavior, irrelevant alarms may have this effect – the "car alarm" syndrome.

3 Partnership for Public Warning, Protecting America's Communities: An Introduction to Public Alert and Warning, June 2004 (PPW Report 2004-2)

4 Partnership for Public Warning, Protecting America's Communities: An Introduction to Public Alert and Warning, June 2004 (PPW Report 2004-2)

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- The more a warning message is repeated and heard the better;
- The content should include who is making the recommendation, who should follow the recommendation, why they should do it, what they should do, and when they should do it;
- The message style should be clear, specific, accurate, certain, and consistent;
- The warning should come from a credible source, and credibility may vary between elements of the population to be warned.

Most recipients will want to validate the information before taking action. The message should refer recipients to multiple preferred sources for validation (e.g., tune to your local radio station, reference an official Web site) to ensure access. If this reference is not provided in the message, recipients needing additional information will often call 9-1-1, tying up emergency circuits when they are needed most. Additionally, 9-1-1 dispatchers may not be able to provide additional public information. Referring to 2-1-1 or 3-1-1 is also an option, but it may add to congestion of the telephone network.

In order to take appropriate action in response to an alert, the public must understand the warning process. Therefore, a comprehensive public education program is an essential part of an effective alert and warning system.

3.1 National Alert and Warning Initiatives

There are several on-going alert and warning initiatives at the national level:

1. Migration to Common Alerting Protocol (CAP)

The objective of the Common Alerting Protocol (CAP) is to define "a single message format with the essential features to handle existing and emerging alert systems and sensor technologies."[5] CAP was adopted by the Organization for the Advancement of Structured Information Standards in 2004. CAP allows the sender of an alert message to activate many types of warning systems with a single input, thus ensuring a common message is sent to as many warning devices as possible. In structuring the message format protocol the standards crafters based the template on findings of academic research and real-world events. The structure includes four general groups of message components[6]:

- Alert: This group of message elements includes such essential elements as the originator of the message, the date/time it was sent, its status (e.g., actual warning, exercise warning, or system test), scope (e.g., public audience, restricted audience, or private), and message type (e.g., alert, update, or cancel).
- Info: This group of message elements includes the event, urgency of the event/alert (e.g., action should be taken immediately, soon, or near future), severity of the event (e.g., extreme, severe, moderate, or minor), and certainty of occurrence (e.g., very likely, likely, possible, or unlikely).
- Resource: Allows for inclusion of additional information to enhance the elements under the "Info" section.
- Area: A text description of the impacted area.

5 CAP Fact Sheet, CAP Cookbook, www.incident.com

6 OASIS Common Alerting Protocol, v. 1.0, p. 9-19, describes all required and optional message components.

2. Commercial Mobile Alert System (CMAS)

In April, July, and August 2008, the Federal Communications Commission (FCC) adopted rules for the Commercial Mobile Alert System (CMAS), a system by which mobile service (e.g., cellular telephone and pagers) providers will relay authenticated emergency messages and alerts to their mobile device customers. The creation of the system was mandated by the Warning Alert Response Network Act, enacted in 2006. Participation in the CMAS will be voluntary on the part of commercial mobile service (CMS) providers. However, the major nationwide wireless service providers have indicated they will participate in CMAS; network wireless service providers were required to file their election on September 8, 2008. Customers with CMAS-capable devices will automatically receive a broadcast text message alert by participating wireless service providers when issued by authenticated government sources. Messages will be targeted to an area not larger than the provider's approximation of coverage for the county or county equivalents specified by the alert area.

A key role in the functioning of the CMAS is the "Alert Aggregator". According to the FCC summary of CMAS[7] , the Alert Aggregator "would receive, authenticate, validate and format federal, state, tribal and local alerts and then forward them to the appropriate CMS Provider Gateway. The CMS Provider Gateway and associated infrastructure would process the alerts and transmit them to subscriber handsets." Until recently, it had been unclear which federal agency would take on this Alert Aggregator role. However, on May 30, 2008, the Federal Emergency Management Agency (FEMA) announced that it would take on the Alert Aggregator role, subject to several conditions. Of particular interest to the state, FEMA indicated that "the federal aggregator will interface, but not interfere with, existing state and local alerting systems" and that "states would be responsible for determining and identifying those persons who have the authority to send alerts for their specific jurisdictions". According to the FEMA release, the system by which this Alert Aggregator would perform its function has not yet been designed or engineered[8]. FEMA's Government Interface specifications are due by the end of 2008[9].

3. Emergency Alert System (EAS) and the Integrated Public Alert and Warning Systems (IPAWS)

A key element in local, state, and national warning strategies is the Emergency Alert System (EAS), which relies on broadcast television and radio and the NOAA Weather Radio Network to transmit emergency information. "The EAS is a system for national, state or local emergency warnings to the public. An EAS warning may be for a few blocks or widespread - large parts of a city, sections of specified areas (such as a county or parts of adjoining counties) or a part or all of a region; or several states or the entire nation. In California, the EAS is used for warnings of an immediate action, such as severe thunderstorms or tornadoes, forecast or actually occurring, evacuations of areas due to an incident (such as a hazardous spill) or a tsunami, or other event requiring immediate action.[10]"

7 Federal Communications Commission, Public Safety and Homeland Security Bureau website, "Mobile Telephone Alerts"

8 Federal Emergency Management Agency, "FEMA to Assume Aggregator/Gateway Role for nationwide Cell Phone Alert System", May 30, 2008, release number HQ-08-090

9 FCC Third Report and Order PS Docket no. 07-287, August 7, 2008

10 State of California Emergency Alert System, State EAS Plan and Operations Orders, November 2002.

EAS is the updated version of the Emergency Broadcast System, which originated in the 1960s in response to both natural disaster and national security needs. FEMA is statutorily responsible for the national EAS and has designated the FCC to coordinate broadcaster participation; in California, coordination of EAS is done by the Governor's Office of Emergency Services. Broadcasters are mandated to participate in national level alerts but participation in state and local level alerts is voluntary. (However, obtaining this voluntary participation has not been a problem in California.) Under the current EAS, the alert messages are relayed to the "Primary Entry Point", which then relays it to other radio and television stations for rebroadcast.[11] Due to its size, California has a primary (KCBS, San Francisco) and secondary (KFWB, Los Angeles) "Primary Entry Point", and a designated "State Entry Point" (KFBK, Sacramento). California has 23 local EAS areas, each with a primary local entry point. Local EAS areas are identified in Appendix __ to this report.[12]

In June 2006, President Bush issued an Executive Order stating that it is the policy of the United States to have "an effective, reliable, integrated, flexible, and comprehensive system to alert and warn the American people."[13] The Integrated Public Alert and Warning System (IPAWS) is a federal public-private initiative, coordinated by Department of Homeland Security/FEMA, to address this mandate. It is to establish "next generation public communications and warning capability…to allow the President and authorized officials to effectively address and warn the public and state and local emergency operations centers via phone, cell phone, pager, computers, and other personal communications devices."[14] It will use digital technology to send emergency alert data to a variety of media and devices. It will allow messages to be transmitted in audio, video, and text, and in multiple languages including American Sign Language and Braille.[15] IPAWS will primarily update the existing EAS.

The United States House of Representatives Subcommittee on Economic Development, Public Buildings, and Emergency Management held a hearing on June 4, 2008, that addressed the status of IPAWS. It noted that FEMA is conducting 14 pilot projects throughout the nation to develop various aspects of IPAWS. The Subcommittee staff report[16] notes that many of the pilot projects are concluding, yet there does not seem to be a clear plan and timeline for IPAWS implementation.

Follow-up legislation, the "Integrated Public Alerts and Warning Systems Modernization Act of 2008" (H.R. 6038) was introduced in the US House of Representatives in May 2008. It amends the Robert T. Stafford Act to direct the President to modernize the alert and warning system. It memorializes in statute much of the current IPAWS, CAP implementation, and CMAS initiatives and the directives of Executive Order 13407. As of November 2008, this bill remains under consideration in the House Subcommittee on Economic Development, Public Buildings, and Emergency Management.

Additional federal legislation, the "Alerting Lives through Effective and Reliable Technological Systems Act of 2008 or ALERTS Act of 2008" (H.R. 6392), was introduced in June 2008. It would amend the Homeland Security Act of 2002 to direct the Secretary of Homeland Security to establish a national integrated public alert and warning system, including a commercial mobile alert

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11 Memorandum from Committee on Transportation and infrastructure Oversight and Investigations Staff to Members of the Subcommittee on Economic Development, Public Buildings, and Emergency Management, Subject: Hearing on "Assuring Public Alert Systems Work to Warn American Citizens of natural and Terrorist Disasters", June 3, 2008, pages 1-2.

12 State of California Emergency Alert System, State EAS Plan and Operations Orders, November 2002.

13 Executive Order 13407, "Public Alerts and Warning System", signed by President George W. Bush, June 26, 2008.

14 Federal Emergency Management Agency website, "Integrated Public Alert and Warning System", "What is IPAWS?"

15 Federal Emergency Management Agency website, "Integrated Public Alert and Warning System", "What IPAWS Does"

16 See footnote 11

system. It would also require establishment of common alerting and warning protocols, standards of performance, and terminology; capability to adapt the dissemination of information and the content of communications on the basis of geographic location, risks, or user preferences and to alert special needs populations; and authorize the use of federal grant funds to permit state, local, and tribal governments to improve public alert and warning capabilities. As of November 2008 this bill remains under consideration in the House Subcommittee on Emergency Communications, Preparedness, and Response.

3.2 State Level Alerting and Warning History in California

The need to issue a state-wide alert in California is extremely rare. Nonetheless, there are several tools available statewide to assist local agencies with the issuance of public warnings. State law, specifically the Emergency Services Act, provides the authority for local and state government to issue warnings.

1. Emergency Management Organization in California

Emergency management in California is guided by the Emergency Services Act (ESA) (California Government Code, Title 2, Chapter 7, Sections 8550-8668). The ESA establishes principles and structures for preparing for, responding to, and recovering from emergencies, including the issuance of alerts and warnings, coordination with local and federal entities, and through public/private partnerships. The ESA (specifically Section 8588.1) also addresses managing emergencies through public/private partnerships and some of the authority addresses issues specifically related to alerts and warnings, including development of "systems so that government, businesses, and employees can exchange information during disasters" and of "programs so that businesses and government can work cooperatively to advance technology that will protect the public during disasters."

The ESA authorizes the preparation of the State Emergency Plan. The plan governs emergency response and recovery in the state, including the roles of state and local agencies. The State Emergency Plan outlines the California Warning System (CALWAS), although this system provides for intergovernmental warning, not warnings directly to the public.[17] The ESA and the State Emergency Plan also identify the Standardized Emergency Management System (SEMS) as the system to be used in California to manage emergencies involving multiple jurisdictions and multiple agencies.[18] Although SEMS does not specifically address alert and warning, it is the system accepted by California's emergency management community for addressing common approaches to emergency response. Further development of statewide alert and warning capabilities should be consistent with SEMS.



17 The California Warning System (CALWAS) and the National Warning System (NAWAS) have been in place, in some form, since the 1950s and are fully funded and regulated by the Federal Government. They exist to relay alert and warning information from the federal level to states (NAWAS) and from California to the counties (CALWAS). These systems do not provide warnings directly to the public; rather, they provide notification to emergency officials. The intersection of NAWAS and CALWAS is the State Warning Point; this function is performed by the 24-hour California State Warning Center, located at OES Headquarters. CALWAS messages are received at local warning points, which (generally) are collocated with the primary Sheriff's 24-hour dispatch centers in each county.

18 Office of Emergency Services, "Standardized Emergency Management System (SEMS) Guidelines", Part I, 2006. Also, SEMS is how California implements the National Incident Management System (NIMS), as mandated by the federal government.

2. Emergency Digital Information Service (EDIS)

The Emergency Digital Information Service (EDIS) is a "state operated public warning system that links emergency managers to the news media, public, and other agencies. It is part of the state's Emergency Alert System (EAS) and is available without charge to local, state, and federal agencies serving California."[19] EDIS is comparably inexpensive to operate, is reliable, and is acknowledged as an official source of information. EDIS is a "backbone" or integration system, allowing messages generated by authorized agencies throughout the state to be distributed to areas in California that need to receive the warning. EDIS can also potentially serve as a "subaggregator" under CMAS (as discussed in Section 3.1.2), if such a function is authorized under the federal regulations. The Working Group found EDIS to be very powerful but currently underutilized.

EDIS has been in operation since 1990 and provides text-based information to news media, emergency managers, and other users via the Internet to e-mail, computer desktop, or text-enabled mobile devices in near real time. EDIS can also be used to transmit warning messages to the EAS, which then broadcasts them to the public via television or radio. Several counties (including Contra Costa and San Luis Obispo) currently use this EDIS/EAS linkage as part of their local alert and warning systems. EDIS is fully compatible with CAP, enabling "plug and play" with other CAP-compliant means of issuing alerts and warnings. Messages are created on the Internet, allowing authorized operators to create them at any location with Internet access. EDIS has the capability to work with Geographic Information Systems (GIS) to target warning delivery. EDIS can be used as the nucleus of an expanded local, regional, and state alert and warning system in California. An EDIS fact sheet is included as Appendix __ to this report.

3. Assembly Bill 2393

AB 2393 (Levine), regarding telecommunications emergency backup power and notification systems, requires the California Public Utilities Commission (CPUC) to investigate certain aspects of alert and warning via automatic dialing-announcing devices. AB2393 is a legislative mandate directing the CPUC to investigate benefits and costs of establishing standards for the use of automatic dialing-announcing devices in California. This effort recognizes the growing importance of use of automatic dialing-announcing devices for emergency notification in California.[20]

3.3 Local Alerting and Warning Activity

As noted in Section 3.0, most public warnings are issued by local governments. They have been particularly applied when protective actions – evacuations or sheltering in place – are required. Local responsibilities for how warnings are issued, and who is responsible for doing so, are outlined in local Emergency Operations Plans and supporting procedures. A decision to issue an alert or warning is part of tactical operations and such a decision is generally made by the incident commander or the jurisdiction's emergency director. Making this decision is a distinctly different task from the technical operation of the alerting system (such as initiating the auto-dial system or activating the sirens) and also will likely be performed by different personnel. Issuing a warning is also distinctly different from providing ongoing information to the public on the incident.

19 California Governor's Office of Emergency Services, Emergency Digital Information Service Fact Sheet (no date).

20 Because of its standing as a leader in emergency communications, large population, and unique topographical and demographic challenges, California is ideally suited to test the Commercial Mobile Alert System (CMAS) through a First Office Application (FOA) or Early Adoptor, the goal of which will be to identify obstacles, solutions and best practices for a nationwide rollout of this technology. An expansion of EDIS could be an FOA for which California can apply. See CPUC docket R.07-04-015.

Too often, those unfamiliar with the warning system tend to view "warning" and "public information" as interchangeable. In most situations, those making the recommendation to the incident commander to issue a warning and those operating the alerting system will not be the incident public information officer. However, warning and public information must be closely coordinated as there is a need to follow-up alerts with public information to provide supplemental and updated information. The transition from "warning" to public information should be addressed in local plans and procedures.

At the local government level, alert and warning options are varied and have mixed capabilities. Systems range from the relatively low-tech (such as sending deputies door-to-door or driving through a neighborhood making announcements via bullhorn) to sophisticated auto-dial telephonic emergency notification systems. Some jurisdictions continue to use outdoor sirens. EAS is also used. Many jurisdictions use multiple systems to maximize distribution of the warning. Every year, more local agencies are investing in warning technology. It is critical that whatever statewide system is developed be cognizant of and support these local investments.

Many jurisdictions have invested in auto-dial telephonic emergency notification systems. Such systems were used to issue evacuation orders in some jurisdictions impacted by the 2007 Southern California wildfires and 2005 floods and to issue shelter in place messages for refinery releases in Contra Costa County. In most cases, these systems are operated and supported by third party vendors, although some local agencies operate their own systems. Through these systems, a message is automatically sent to telephones identified as being within the warning target area. Most systems access landline telephones in the warning area based on address and can also be sent to other devices in the warning area, such as TTY and mobile devices, if the citizen voluntarily opts-in and registers those numbers with the local jurisdiction. Most systems also will not reach transient populations (such as visitors) in the warning area. Telephone system capacity and throughput may pose additional limitations. There currently are no performance standards for these auto-dial systems.

Some jurisdictions continue to use outdoor siren systems. Sirens do not provide information on the specific threat, but trigger those hearing the siren to access other media, such as a local radio or television station or an Internet site, to identify the hazard and recommended action. Effective use of sirens is dependent on corresponding public education and routine system testing. Siren systems can be expensive to purchase and maintain. Sirens may not be heard by persons indoors. However, in some applications, such as at the beach for tsunami warnings, sirens may be very effective.

The EAS is used by many jurisdictions. Much of the population is familiar with EAS due to encounters with regularly scheduled system tests. However, persons within the warning area must be listening to the radio or watching television at the time the system is activated in order to receive the alert. EAS messages cannot exceed two minutes in length, so only limited information can be provided. EAS messages cannot be targeted. Warnings issued via EAS reach

everyone who happens to be watching or listening to that station at the time the alert is issued, generally a much larger population than that to whom the warning is targeted. Some jurisdictions are served by multiple media markets. Unmanned stations (particularly radio stations) may also not be able to distribute the EAS warning in a timely manner.

This mix of alert and warning notification presents many challenges. The public must be educated on a continuous basis about the various systems, and, in a day and age of almost "instant information", the public has come to expect instant information about emergencies and disasters. Since commercial radio and television stations in many areas are automated, there may be delays in broadcasting of live updated coverage of a local disaster.

There are other local warning challenges as well, including:

- Some areas of the state have communications related infrastructure challenges (such as intermittent or no cellular phone coverage or frequent commercial power outages) that can inhibit receipt of warning messages;
- A lack of pre-scripted messages or the ability to develop on-the-spot information for the public;
- Difficulty in providing meaningful warnings outdoors for transient populations such as campers, hikers, the homeless, etc.;
- Notification of those with hearing and/or visual disabilities;
- Understanding of the message by individuals with cognitive disabilities;
- Providing warning messages in the multiple languages used in California.

3.4 Alerting and Warning Persons with Disabilities

The Statewide Alert and Warning System, including both the issued warning and sources available to validate the warning, must be accessible to people with diverse disabilities. According to the U.S. Census of 2000, there are almost six million people in California who identify as having a disability. By 2010, the number of individuals with disabilities will exceed 11 million, which is approximately 23 percent of the total population. Furthermore, the state's population of older adults is growing and according to the California Department of Aging, there will be approximately 6.5 million people over the age of 60 by 2010 and almost 12.5 million people over the age of 60 by 2040. In order for alert and warning systems to effectively reach people with disabilities, the systems should employ a variety of communications methods and multiple formats that are accessible to the targeted population. Accessible formats for deaf and hard of hearing populations include TTY, American Sign Language, and telephone and video relay services; instant messaging and text messages are increasing in use in the deaf community. Accessible formats for individuals who are blind/low-vision include large print, Braille, CD, and audio. Web sites and any information posted must comply with Section 508 of the Rehabilitation Act of 1973, to ensure that screen reader software is functional and text size can be adjusted. People with limited reading ability, cognitive and mental health disabilities may require alternate methods of delivery such as the use of pictures and symbols. Further development of the Statewide Alert and Warning System must include representatives of the diverse groups of disability from the community.[21]

21 Disability Rights Advocates, Effective Outreach to Persons with Disabilities, June 2007. Although this document addresses guidance for California utilities in outreach to persons with disabilities, the principles appear to be equally applicable to the development of alert and warning systems.

A recently completed after action report on the 2007, Southern California wildfires[22] specifically addresses a variety of issues of concern to the diverse disability communities in California that arose from the response to and recovery from the wildfires, particularly experience in San Diego County. A number of the findings directly address issues related to alert and warning. The report states "it is critical that people who have limitations of seeing, hearing, understanding, cognition or intellectual abilities and limited language proficiency receive information that is functionally equivalent (that is, equal to the same information received by people without disabilities) in order to prepare before, during, and after a disaster."[23] The report makes several recommendations that should be considered in development of the Statewide Alert and Warning System, its governance structure, and supporting materials, including planning guidance and training. Many of the recommendations made in that report echo those in this report, including use of redundant warning methods; involving community and non-profit organizations as partners in the warning process; ensuring accessibility of the warning systems to all device users; and involving representatives of the diverse disability communities in system development. The after action report also makes findings and recommendations with regard to emergency registries, television broadcasting during emergencies, and public safety answering points that may be useful in further development of the Statewide Alert and Warning System.

1. The role of alert and warning registries

Given the highly mobile nature of the population and the diverse communication needs of individuals, particularly individuals with disabilities, registries are currently the only means of ensuring that everyone has the opportunity to receive emergency alerts on a device that they actually use, in a format that they can understand. For example, telephonic alerts directed to landline phones will not reach the 13% of households that do not have wireline service[24], as discussed in section 5.4.3, and will be similarly unhelpful if no one is at home to receive the message. Individuals who do not have a landline phone or who know that they are frequently away from home can fill this potential communication gap by either voluntarily opting-in by registering their cellular phone number or other mobile device to receive alerts or by using a CMAS capable cellular phone or other mobile device on which to receive alerts when those devices become available. Moreover, people may wish to register to receive alerts for geographic areas in which they do not live themselves but in which they have a personal stake, such as the area where an elderly parent or someone else for whom they have caregiver responsibility resides, although the ability to provide this capability is subject to the technology used to deliver the alerts.

Registries serve especially important functions for people with disabilities. As was noted in the Southern California Wildfire After Action Report discussed above, TTY numbers must also be registered in order for deaf or hard-of-hearing individuals to receive alerts on those devices. As with the option to register cellular phones for telephonic alerts instead of or in addition to landlines, individuals who use TTYs may choose to register a pager or PDA instead of or in addition to a TTY so that they can receive alerts when they are away from the TTY's location.

22 Kailes, J. 2008. Southern California Wildfires After Action Report, prepared in partnership with the Access to Readiness Coalition, The California Foundation for Independent Living Centers, and The Center for Disability Issues and the Health Professions at Western University of Health Sciences

23 Ibid, page 48.

24 See footnote 23, CPUC Report: Residential Telephone Subscribership and Universal Service, June 2008.

Finally, registries enable people to customize their communications preferences, thus enabling messages to be sent in a manner that the recipient can immediately and independently access. For example, deaf and hearing-impaired individuals might want to specify that they receive any verbal messages as text, while blind and visually impaired people might state that they wish to receive any text-based alerts in spoken form. Similarly, people with cognitive impairments might request that messages sent to them be repeated or include pictures and symbols. This customization of messages would also allow people who speak languages other than English to indicate the spoken or written language in which they wish to receive messages.

As technological capabilities advance, it may become easier to store these communication preferences and to coordinate simultaneous delivery of messages to various types of devices in multiple formats. There may come a time when automation can carry out aspects of this process that cannot yet be envisioned; however, given the truly life-and-death importance of an effective emergency alert system, manually updated registries are an essential stopgap until, as the Southern California Wildfire After Action report put it, "'auto-detect' [features and other technological] capabilities are proven to work effectively."[25]

However, there also are some serious limitations to emergency registries. They are time consuming to maintain. Individuals and households that need to register in order to receive automated telephonic alerts (such as TTY or cell phone users) may not be aware that they need to register or that they need to reregister if they move or change devices. It must be recognized that not all the hearing impaired will register and those that have not will miss a warning or alert. The act of registering may also give those who have registered a false sense of security, such as that they may also be receiving targeted services in the event of an emergency. Requiring advance registration of TTY devices may create in the public safety agency a false sense of security for those utilizing TTY will be alerted. Also registration in the place of TTY detection creates a significant vulnerability in households where there are both TTY and conventional phone users (a common situation). If a line is registered and a hearing person answers with a conventional handset they will hear only the TTY tone and miss the message.

25 Kailes, J. 2008. Southern California Wildfires After Action Report, prepared in partnership with the Access to Readiness Coalition, The California Foundation for Independent Living Centers, and The Center for Disability Issues and the Health Professions at Western University of Health Sciences; recommendation 17.

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Work Group Process 4

The work group process specified in AB 2231 was initiated in March 2008, with the first meeting of the Alert and Warning Working Group (AWWG) held on March 27, 2008. Subsequent AWWG meetings were held June 24, 2008; September 18, 2008 and December 5, 2008. Summaries of the work group and work team meetings are included in Appendix __ to this report.

Composition of the AWWG and the work teams emphasized the public-private partnership nature of the alert and warning process. Representatives of many aspects of the communications industry, state and local government, and special needs populations actively participated in the AWWG and all of the work teams. A listing of work group and work team participants is included as Appendix __ to this report.

Much of the work was conducted through subcommittees ("work teams") addressing four key areas: (1) Technical Issues, (2) Social Issues, (3) Standardization, and (4) Funding, Legal, and Liability Issues. The issues identified by the work teams have been combined in to common issue areas for the purposes of this report. The focus and process used by the work teams is described in Appendix __.

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Issue Identification 5

Through the process outlined in the prior section, the work teams identified issues in development, implementation, and maintenance of a Statewide Alert and Warning System. Different aspects of many of these issues were identified by multiple work teams. The following listing reflects the combined findings of all of the work teams. Recommendations based on these findings are identified in the following section.

5.1 Structuring California's Statewide Alert and Warning System

1. Compliance to CAP and other national initiatives

Whatever alert and warning system solutions are implemented, they must be consistent with the Common Alerting Protocol (CAP). Adherence to the Common Alerting Protocol (CAP) is essential in assuring interoperability, ensuring adaptability to new technologies, and creating a "system of systems".

CMAS, the Federal cellular notification system initiative, has not been fully implemented yet but the Work Group agreed that the State should not develop its own wireless alerting system in the mean time. Formalization of the national wireless approach (testing and initial deployment) is about two years away.

The state's alert and warning system will need to adapt to the changing federal and technological landscape. While California's Statewide Alert and Warning System should be a standardized structure implemented locally, national and regional compatibility is very important. The system should be seamless from the federal level to the state level to the regional and local levels.

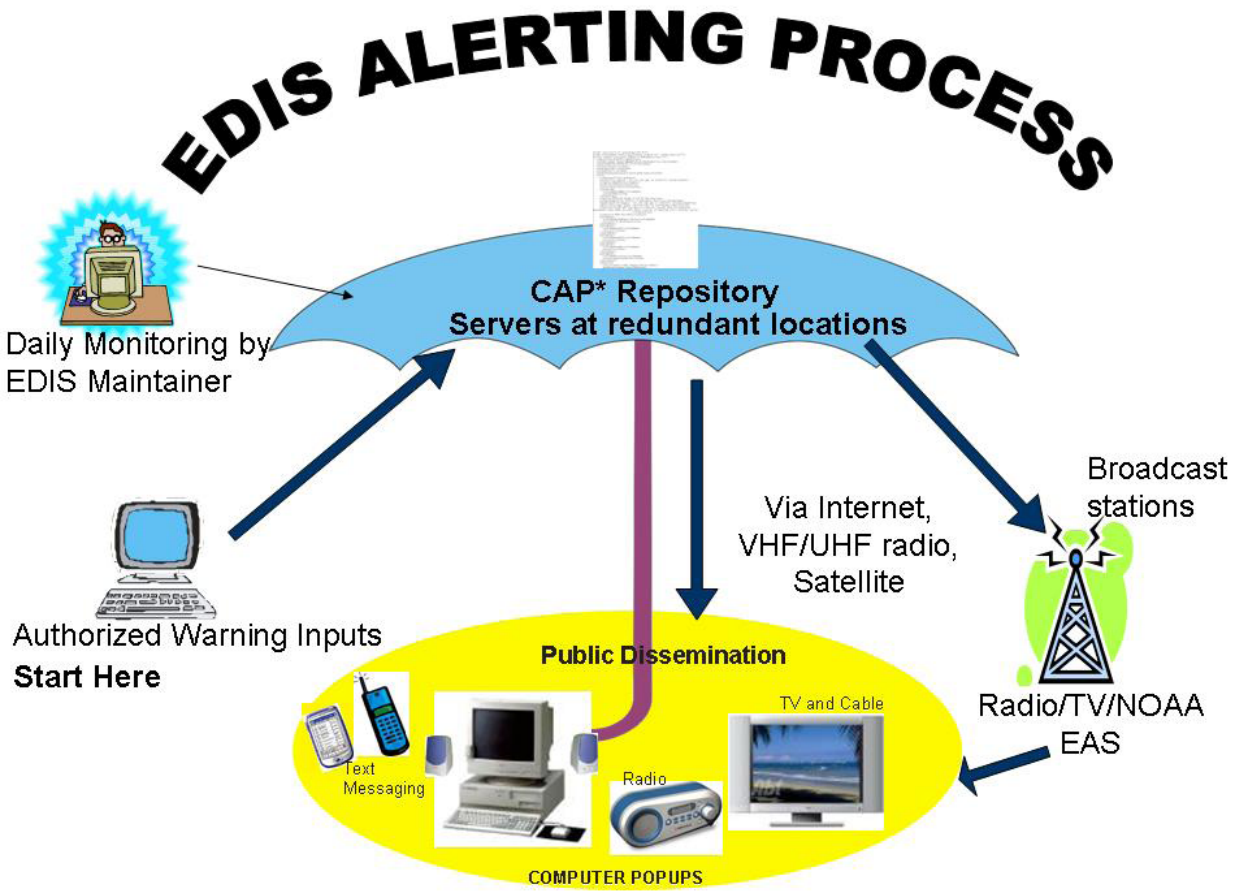
2. EDIS

California's Emergency Digital Information Service (EDIS) should serve as the backbone for the Statewide Alert and Warning System. EDIS uses the Common Alerting Protocol (CAP) that is the foundation of the federal Emergency Alert System (EAS), Commercial Mobile Alert System (CMAS), and Integrated Public Alert Warning System (IPAWS) efforts. It can be used by authorized government agents to generate messages that can be relayed to network providers for delivery on a variety of platforms. The following diagram outlines how EDIS could be used as the backbone of California's Statewide Alert and Warning System.

In order for EDIS to provide this pivotal role, (1) emergency managers must be able to count on it being there (reliability) and being supported; (2) technology must be kept up-to-date; (3) emergency managers, broadcasters, and other partners must know how to access and effectively use it; and (4) the system must be maintained.

EDIS requires continued investment. There is a need for defined ownership and support (programmatic and financial) for EDIS at the state level. Work Group participants recommend that

the Governor's Office of Emergency Services (OES, as of January 1, 2009, the California Emergency Management Agency) be given the responsibility and budgetary support necessary to maintain and manage EDIS, including necessary upgrades to maintain consistency with emerging federal alert and warning initiatives.



* CAP – Common Alerting Protocol Format

The state should continue to take the lead role in further development and maintenance of EDIS in order to assure a common statewide platform. Benefits of having the state continue to maintain and manage EDIS include consistency of message structure across the state; the economies of scale of a single system, including for CMAS interface; and centralized technical assistance, such as providing common guidance on accessibility of systems and messages for special needs populations. Another advantage is uniform authorization and user verification procedures. However, in order to fulfill a statewide alert and warning notification role, EDIS needs enhanced redundancy and programmatic attention to existing shortfalls in functionality.

3. Integration with existing local warning investment

Primary responsibility for issuing public warnings should remain with local government. These alerts are issued by local emergency managers, who understand the impacts that a specific hazard or event will have on the local community and can communicate to alert recipients the most appropriate actions to take.

Developing and maintaining local alert and warning capability is the keystone of a statewide system. California's Statewide Alert and Warning System should be designed to work with diverse warning systems that have already been procured by local government. California's Statewide Alert and Warning System should be a standardized structure that is implemented locally. The state should maintain the statewide alert and warning system structure. Local agencies should be responsible for maintenance of their systems that tie into the statewide public warning system. This may require older, non-CAP compliant systems to be upgraded. Capability for state officials to activate the system must be retained, both for statewide alert situations and as a backup for local activation, and statewide alerting capability must be seamlessly linked to federal alerting systems, such as those maintained by the National Weather Service or the U.S. Department of Homeland Security. The system should support interoperability with local systems, not supplant local efforts.

The Statewide Alert and Warning System should eventually be able to target messages to the city or neighborhood level, rather than issuing the warning to the entire county.

In rural areas, particularly, there may also be a need to support development of new/additional infrastructure that will enable broader reach of broadcast messages. This could include "fast-tracking" of new wireless towers in areas with limited coverage.

5.2 System Governance and Maintenance

A solid governance and maintenance structure is necessary for the success of California's Statewide Alert and Warning System. Governance refers to establishing a shared vision and collaborative decision-making process involving multiple stakeholders to support progress toward developing and maintaining California's Statewide Alert and Warning System. Maintenance includes ongoing program support, including continuous improvement based on system use and evaluation. Maintenance would also include providing a voice for California in the further development of national alert and warning systems.

1. The California Public/Private Partnership for Alert and Warning should be created

It is recommended that the California Public/Private Partnership for Alert and Warning (Partnership) be created as the basis of a formal governance structure for the Statewide Alert and Warning System and have a formal charter established (including goals, objectives, timelines, etc.). Program support responsibilities for California's Statewide Alert and Warning System should be formally assigned to a state agency, most logically OES (or as of January 1, 2009 California Emergency Management Agency). A solid governance structure is key to public confidence in the message.

Governance of California's Statewide Alert and Warning System must incorporate all partners in the process. The Partnership should include representatives of fixed and mobile service and device providers, local and state agencies, diverse disability groups, non-English speakers, academics, third-party emergency alert and telephone notification vendors, and other key players.

The objective of the Partnership should be ongoing support of and accountability for a seamless, integrated standards-based public warning capability. The Partnership should address and involve all aspects of alerting and warning, including EDIS, EAS, and CMAS. One of the roles of the Partnership will be to define what elements of the statewide alerting and warning system need to be

standardized and what can be locally tailored. Consistency among local programs can be fostered through planning guidance, review of local plans, professional standards of practice, common training, and credentialing.

In order to assure that the public warning and commercial communications systems support each other, representatives of the commercial communications networks must be part of the ongoing state alert and warning system governance structure. Delivery of alert and warning messages relies upon a variety of commercial networks (telephone, mobile device, internet, cable, satellite, television and radio) whose primary mission does not directly include delivering alerts and warning messages. Although most commercial providers have embraced their role in the alert and warning process, it is with the understanding that this alert and warning mission not overwhelm the capability of the systems.

The work group, however, did not reach consensus on a recommendation that the Partnership be codified in statute (similar to the Public Safety Radio Strategic Planning Committee, Government Code 8592, et.seq.). On the one hand, codification would reiterate Legislative support of the Statewide Alert and Warning System and establish it as a formal "program" of state government. Formal establishment also might make maintenance of the system less likely to ebb and flow based on executive support. On the other hand, establishing the Partnership in legislation would take up to two years, creating a gap between the current work effort and the formal establishment of the Partnership. It also might inhibit flexibility to adapt Partnership membership to changing technology or system governance priorities. An Executive Order could be used to establish the Partnership or the Partnership could be chartered under the auspices of existing statute as either a Specialist Committee under the SEMS maintenance system (Government Code 8607) or the current Emergency Preparedness Public/Private Partnership Initiative (Government Code 8588.1).

2. Standards of practice

"Standards of practice" are written guidelines established to guide or measure performance. Common standards of practice, both for when warnings are issued and how they are issued, should be developed. This is a key activity that the Partnership can influence. Developing these standards is key to developing other needed pieces of the system, such as standardized training and standards for evaluation of vendor products for accessibility and effective communication for people with disabilities and other special needs populations. Developing consensus standards of practice for the statewide alert and warning system will support a fully integrated, interoperable system. Processes should also be developed for coordination across jurisdictional boundaries (for multi-county events or where impacts cross county boundaries).

3. Multi-jurisdictional warnings

Procedures and protocols for coordinating and reconciling alerts and warnings that impact multiple local jurisdictions are needed. Although warning messages should continue to be locally generated there is a need for regional coordination. Without this coordination, it is possible that conflicting instructions could be given on evacuation timing, routes, and other necessary information; this could have potentially fatal results. This need for coordination is true for both multi-jurisdictional emergencies and for EAS messages released for jurisdictions in split media markets. Coordination of multi-jurisdictional warnings is one of the primary benefits of a statewide system including collaboratively developed standards of practice.

5.3 Crafting the Warning Message

The content of the warning is as important as how it is delivered. This includes ensuring the message speaks directly to the actions to be taken, is understandable by all populations within the warning area, and is targeted to the audience.

1. Templates

The alert/warning message should directly speak to the action to be taken. The message should address five elements identified in academic research on successful warnings; they should be clear, specific, accurate, certain, and consistent. Appendix __ provides a sample EAS message template used by San Luis Obispo County.

The message should be simply worded (3rd grade level suggested) and there should be agreement upon common terminology. Jargon should be avoided. Messages should specifically state who should and who should not take action. Awareness of how words are interpreted by diverse audiences and the use of pictures and symbols is also needed. Likewise the variations and limitations of different delivery methods should be considered.

Templates should be developed for common warning situations. Different templates may be needed for different devices (e.g., character limitations for text messages, following the format of CMAS). Some agencies, such as the California Highway Patrol (for AMBER Alerts) or California Department of Transportation (for highway reader signs), may already have templates or messaging guidelines. Messages should include identification of a source for additional information and there should be a clear differentiation between warning messages, follow-up information, and general public education. Messages should enlist neighbors to help neighbors (such as "reach out to those who you may know are unable to receive or understand this message").

There should be a clear differentiation between warning messages, follow-up information, and general public education. Messages should also be numbered or otherwise identified so they can be read in the correct order.

2. Translation

Several different populations have a need to have a message crafted or translated to meet their particular needs, although meeting the preferences for 100 percent of the population may not be feasible. Differing needs include type of media used, cultural considerations, transient populations, etc. The intent of the warning message may not always be accurately portrayed by a word for word translation in another language. How the message will be received (audio, text, video, pictures, symbols, etc) needs to be addressed along with content. Cultural considerations need to be considered in the crafting and delivery of the message (e.g., gender of person delivering the message, law enforcement vs. fire services). Changing demographics are also likely to impact alert and warning in California. Different age groups, for one, have different preferences in technology. Development of templates will make translation easier.

During the preparation of this report no automated translation technology was identified that has proven to be effective enough to be used for public safety; there is a need to define minimum performance standards for these systems. Translation from spoken languages to Sign Language is particularly challenging. Translation could occur at the originator, middleware/aggregator, or

client level and is dependent on the delivery mechanism. The need for appropriate translation to multiple communities underscores the importance of having a system employing many different methodologies of dissemination. There is a need for additional information on technologies that may be available for "automatic" translation of alert and warning messages. In addition, there is a need for more qualified translators in order to assure timeliness of translations in instances when "automatic" translation is not available.

3. Corroboration will be sought

Warning response research indicates that message recipients will seek validation of the information contained in the message. Confirmation from formal and informal sources must be anticipated and considered as part of the overall warning "system". The role of public-private partnerships, community based organizations, non-governmental organizations, and other sources in distributing and verifying warning information should be addressed. An accessible source of additional information should be included in alert and warning messages.

Who delivers the warning message is central to its perceived validity and relevance. Is the source credible? How is "credible" determined? Warning system managers and message creators must account for cultural differences/preferences for who issues a "valid" message. Is the source relevant to the location where the warning is being issued? This may be key for warnings that are directed to a region rather than a single jurisdiction (for example, in the event of a repeat of the 1991 East Bay Hills fire, will Berkeley residents evacuate based on an alert issued by Oakland officials ?).

Although warning systems strive to reach as much of the population in the target area as possible, it is important to remember that a warning message or alert may not reach everyone. No warning system can guarantee that all will receive and react appropriately to the message.

It is also likely, especially when issuing a warning via broadcast media, that the message will reach unintended audiences. This emphasizes the importance of making warning messages as comprehensive as possible as to who the message is directed to and what actions the intended audience is to take and when.

5.4 Alert and Warning Technology

1. "Plug-and-play"

The Statewide Alert and Warning System must be able to deliver a single message to various recipients through various media. The system should adopt the principle of "plug-and-play" from the computer world; this is a feature that allows the addition of a new device without requiring reconfiguration or manual installation of device drivers. These various warning delivery media must be virtually equivalent to each other from the message input perspective, so that the operational processes for the message issuer do not change whether the message is sent to mobile devices, computers, landline phones, or whatever communications technologies arise in the future.

The state needs an operational alert and warning platform that can adapt to changing technology, both in terms of message input and output (for the message recipient). The system must also be able to adapt to changes in protocols and procedures, evolving management structures, and the like. An interoperable or "plug-and-play" based system will yield the best results. The work group thought that pursuing a common "exchange" (middleware) solution rather than emphasizing a "mesh" architecture solution may be the most readily achievable. Communications technology will continue to rapidly change. The alert and warning system adopted by the state must be flexible enough to

adapt to, not preclude, future changes. System governance must include on-going evaluation and continuous improvement.

2. Build on existing local investments

Most alerts and warnings are issued at the local government level. As addressed in Sections 3.3 and 5.1.3, many local governments have invested in various types of alert and warning technologies. The various technologies currently in use and their capabilities (including accessibility of the warning messages to the disability community) will need to be taken into account in designing a solution that can accommodate these prior investments. It reiterates the need for a "plug-and-play" solution designed as a "system of systems" incorporating the capabilities and investments of local governments. EDIS has the capability to link with most of the existing alerting systems.

3. Warnings should reach everyone in the warning area

The alert and warning system should strive to reach as many phones and devices as technically feasible that are in use by humans within a particular area at the particular time the warning is issued, whether wired or wireless and without regard to the area code of the number, and without resulting in significant impacts to the telecommunications infrastructure (i.e., ability to make 9-1-1 calls). ("In use by humans" is meant to exclude those phones/devices assigned to fax machines, ATMs, alarm circuits, etc.) One of the most commonly used methods of alerting the public is telephonic emergency notification systems. However, the reach of these systems is currently limited to locations with conventional landline phones, unless individuals using other types of telephone service (TTY, mobile phones or Voice over Internet Protocol [VoIP]) have voluntarily registered to receive the alerts. According to the California Public Utilities Commission, only 87 percent of California homes have landline service. In fact, there are more mobile subscribers in California than landline subscribers.[26] Use of traditional landline phone service varies greatly by community, with lower percentages of landline customers among younger customers and poorer communities. Transient populations (such as commuters and tourists) in an alert area may not be in reach of landline service. Assuring that users of prepaid cellular phones receive alerts may also be problematic until CMAS is widely deployed.

In order to reach all population within the alert area, there may be a need to obtain proprietary information on VoIP, and other non-landline personal devices to assist in the delivery of emergency notifications. This information must be obtained consistent with FCC action and in such a way as to protect companies and customers against unauthorized system access or use of customer data. Generally, the more advanced the technology, the less the ability of the state (e.g., California Public Utilities Commission) to regulate those providers.

Redundancy is essential for reaching different recipient groups. All available methods and options should be used to issue an alert. Reaching rural populations may also require different strategies than reaching urban populations. Warning system protocols must address worst case situations, such as power outages, network congestion, network damage, or a Katrina-like situation where local television and radio stations are not functioning. Also, there should be a focus on public education regarding personal responsibility to receive, understand, and respond appropriately to messages.

5.5 Alert and Warning Accessibility

As addressed in Section 3.4, a significant amount of research has been done regarding the warning system needs and preferences of California's diverse disability community. If California's Statewide Alert and Warning System is designed to take a single message and translate it accurately to multiple methods of communication, this must include translation to communication methods used by people

26 CPUC Report: Residential Telephone Subscribership and Universal Service, June 2008.

with disabilities. Text messages generated by the warning system need to be accessible to devices currently used by the disability community, such as TTY and screen readers. Also, the system must be flexible enough to integrate with emerging technologies, such as video phones and portable video devices. Technical standards for systems/devices for transmitting alerts and warnings to the disability community are needed.

As "standards of practice" are developed they should include standards for evaluation of vendor products for accessibility and effective communication for people with diverse disabilities and other special needs populations. Until such standards are developed, agencies procuring local warning systems should test them, through a process inclusive of the diverse disability groups, for this access prior to any commitment to purchase vendor products or services. Sources for follow-up or updated information must also be accessible.

Alert and warning registries serve important functions for people with disabilities. As was noted in the Southern California Wildfire After Action Report discussed in section 3.4, for most auto-dial systems currently in use, TTY numbers must be registered in order for deaf or hard-of-hearing individuals to receive alerts on those devices. However, technology to detect TTY devices and immediately deliver a TTY message exists and alert and warning vendors should be strongly encouraged to incorporate the technology into their systems. Development and maintenance of registries should be included in warning system standards of practice and in warning system training programs until such time as technology can detect communications preferences.

5.6 Legal and Liability Concerns

As the California Alert and Warning System is established, several issues related to legal and liability concerns should be addressed. In particular, many of the warning system partners were concerned that they could be exposed to legal action if they did or did not issue a warning, or did not deliver a legitimately issued warning. The governance structure should conduct further work in this area.

1. Duty to warn

California law does not include an obligation on the part of government to issue a warning. The ability of government to issue a warning stems from the general responsibility of government to protect public health and safety; it is also tied to an ethical responsibility to provide citizens with critical emergency information. Authority to issue warnings in a given geographical area is usually defined in emergency plans. The work group believed that either further codifying an obligation to warn or defining who is required to issue warnings would not be advisable. Would defining authority to issue warnings inadvertently assign authority to someone who does not want or cannot fulfill that responsibility or take it away from someone who can fulfill the responsibility? Would defining authority to issue warnings inadvertently put local governments at high risk for liability lawsuits?

2. Liability protection

Fear of increased liability should not deter local jurisdictions from investing in warning system technology appropriate for their community. As there appears to be little case law on the topic of public alert and warning, several questions linger. In particular, is liability tied to the inherent ability of the jurisdiction to issue a warning? Does the greater warning capability that a jurisdiction possesses change its liability exposure?

There is a need for "Good Samaritan" protection for those that issue or relay a legitimate warning. However, liability limitations for all parties issuing and delivering alert and warning messages must be contingent on compliance with operational standards. Public policy should promote sharing of critical emergency information in a timely manner. Liability protection should be provided for all partners in the warning system if their actions are in good faith, based on credible information, and consistent with accepted professional standards. Communications carriers transmitting a warning from an authorized government representative to the public in the impact area must be protected from liability when managing their networks in emergency situations with already large call volumes. Liability exposure should be minimized if the message initiators follow these accepted standards of practice, including attribution of the message to its source. Although "Good Samaritan" protection should be codified in statute, standards of practice should be defined and then approved by warning professionals in a public process but not permanently defined in statute so as to allow for changing communications technologies. There may be varying ways of achieving such standards. The federal WARN Act liability language may provide a good model for California.

It is also unknown how "alert and warning operations" relate to other emergency response operations under the recently enacted business/volunteer registry (Assembly Bill 2796, Government Code 8588.2). This bill authorizes OES to "establish a statewide registry of private businesses and nonprofit organizations that are interested in donating services, goods, labor, equipment, resources, or dispensaries or other facilities" and provides some protection from civil liability for damage resulting from such donations.

3. Assessing vendor claims

As indicated in Section 3.3, many local jurisdictions have procured alert and warning systems, particularly auto-dial telephone notification systems, many of which are operated and supported by third party vendors. There are no existing minimum performance standards for emergency notification system vendors operating in California. In the absence of such standards, the governance structure should provide tools for local agencies' use in evaluating, procuring, and implementing emergency notification vendor products. Many of the warning system vendors are not located in California, so the state's ability to regulate them may be limited. There is a national industry association effort to identify emergency notification vendor performance characteristics.[27] To the extent possible, California should participate in those efforts and consider incorporating that performance information into guidance documents.

5.7 Funding

"Alert and Warning" and EDIS do not receive dedicated funding at the state level. Using EDIS as the backbone of California's alert and warning system will require a secure, dedicated source of funding for EDIS. Funding will also be required to support the governance system and public education efforts. In addition to supporting the state hub, funding could be provided for support of local capabilities, similar to the way in which the OES fire engine program supports both local capability and the statewide mutual aid program.

As standards are developed for components of the alert and warning systems, such as emergency notification system vendors, compliance with those standards should be made a requirement for use of state or federal funding to procure such components.

27 Alliance for Telecommunications Industry Solutions (ATIS) news release "ATIS Announces Initiative to Coordinate Standards for Emergency Notification Systems", March 27, 2008.

5.8 Evaluation

Evaluation of the operations of all components of California's alert and warning system is needed to ensure continuous improvement of the system and its individual components. "Evaluation" is intimately tied to establishing "standards of practice", as compliance with these standards is how system performance will be evaluated. Results of formal and informal system evaluations will be used to improve standards, guide training, and improve technology.

It was generally agreed that overall system success should be measured by the extent of compliance with the official recommendations reflected in the warning message. Part of developing the alert and warning system and standards of practice is defining "success" so that the system can be evaluated and modified. This has three sub-elements: reaching the maximum population within the area affected by the warning, stimulating that population to take the appropriate action and ensuring that critical communications infrastructure is not adversely affected.

Standards, guidelines, or targets for various elements of the warning system should be established where they do not currently exist. This should include metrics for technical reach of various warning systems, reliability, and timeliness of issuing the warning. Setting standards guidelines, or targets also will involve the difficult discussion centering on at what point the cost of providing the alert to the last person exceeds the value of functionality of the system.

Standards should also be set for testing of alerting and warning systems. The work group was not in agreement that complete testing of alert and warning systems as part of emergency response exercises was necessary, although the alert decision-making process and message creation should be part of exercises. System activation tests could be done separately. Criteria for evaluating system tests should be established. Education and a consistent testing program are key to mitigating unintended consequences, such as post-test calls to 9-1-1.

After-action reporting and evaluation criteria should be established. A uniform data collection process should be established for purposes of evaluating the system and directing improvements to all aspects of it. There needs to be an ongoing statewide evaluation/assessment process, possibly modeled on the California All Incident Reporting System (CAIRS, formerly California Fire Incident Reporting System or CFIRS). This needs to include a system for evaluating the reported information and providing feedback to the governance structure. Effectiveness of support services (such as use of local 2-1-1 systems for corroborating information and warning-related public education campaigns) should be evaluated along with other elements of the warning system.

A common set of metrics needs to be identified in order to facilitate comparison. Possible metrics include reach, diversity of populations notified, training, relevance, timelines, confidence (both public and agency officials), performance as expected/satisfaction, side effects (traffic or network congestion), reliability, diversity of devices reached.

5.9 Training and Credentialing

Training and credentialing are critical to disciplined operation of California's Alert and Warning System. Successful application requires those using the system to be trained. Warning messages

should only be issued by those "authorized" to do so, and the authorization process requires credentialing, including identity management. Training and credentialing are also key elements in minimizing liability exposure.

1. Training

There is a need to develop standardized alert and warning training tied to and consistent with California's Standardized Emergency Management System (SEMS) and the National Incident Management System (NIMS). Alert and warning training should be part of Operations Section training curriculum developed to support SEMS and NIMS. Training needs to address creation of the message as well as in use of the system. Refresher training on standard procedures is critical. Training programs need to recognize that making the decision to issue an alert or warning and the operation of the alerting system are distinctly different tasks, and also will likely be performed by different personnel. And in most situations, those making the recommendation to the incident commander to issue a warning and those operating the alerting system will not be the incident public information officer. Training for message originators should include how to identify that a warning message is needed, what to include in the message, and how to get the message out. It's important to keep in mind that there is a difference between "alert" and "information." Training should address both the rationale and process for issuing alerts and the need to follow-up alerts with public information to provide supplemental and updated information. The transition from "warning" to public information should also be addressed in training programs. Interagency training is desirable to promote familiarity of mutual aid agencies with systems, personnel, and procedures.

2. Authentication and credentialing

Credentialing and identity management are also important parts of system operations. Identity management addresses how authorized users (message originators and distributors) are identified, validated, and credentialed. Currently local government manages who has authority to issue warnings through their local alerting system and this level of governance must be maintained. However, a common credentialing structure will involve a number of functions, including regional (cross-county) warning systems and statewide interoperability.

Another important element relates to granting access by non-governmental warning system partners into the disaster area (e.g., to repair tower sites), providing them logistical support (e.g., fuel for generators) and the like. Participation by these partners in state and local planning, training, and exercises is critical to building this understanding.

5.10 Public Education

An effective public education campaign that reaches all communities including our most vulnerable population is necessary for an effective public warning system. It should include the what, where, when, who, why, and how alerts are issued, the limits of public warning capabilities and appropriate responses to warning messages. It need not be stand-alone training but should be included as part of general emergency preparedness training. There is a need for training for the general population and a separate, more targeted, need to provide training in our schools.

1. Education of the public about warnings is part of the warning system

Successful alert and warning requires action on the part of the message receivers (the public). The

public needs to understand how the alert and warning system works, especially in their local area. Outreach/public education is needed giving the public more information about the source of warning messages, who issues warning, how they are issued, appropriate responses, etc. There is also a concern that some consumers of non-wireline telephones may not realize that they will not receive locally generated telephone warnings if they have not explicitly registered with their local government for participation. Vendors of telephonic notification systems services should make their potential customers aware of these and other limitations. The public also needs to understand that warnings will to be followed by more detailed status information from other sources. In addition, the public needs to be advised to use the telephone system, including cellular phones and text messaging, only for essential calls during an emergency.

More needs to be done to elicit appropriate public response to alerts and warnings. Alert and warning information should be made a prominent element of general emergency preparedness campaigns. In addition, specialized public education campaigns are needed to target the divergent requirements of California's diverse disability, language, and cultural communities ensuring the accessibility and understanding of Alerts and Warnings by all residents, especially our most vulnerable community members. Nonprofit organizations, community- and faith- based service organizations, and similar groups can play a role in training and promoting appropriate response to warnings. The use of existing emergency preparedness volunteer agencies such as Community Emergency Response Teams (CERT), amateur radio operators, and neighborhood/town watch groups is strongly encouraged. Public education efforts should promote realistic expectations about post-event communications.

To the extent to which the public alert and warning system depends upon commercial networks, the limitations of those systems must be recognized. As such, a partnership between public and private entities will be required in order to ensure that education is presented consistently throughout the language and disability populations to the extent feasible. The public expects that landline telephone, cellular phones, internet, and mobile devices will all be available after a disaster, but this will not be true in all cases.

2. Alert and warning should be taught in the schools

Training on alerts and warnings (and on emergency preparedness in general) should be required in K-12 curriculum, as well as becoming a part of orientation for post-secondary campuses to ensure students transferring in from out-of-state are educated on the system here in California. Materials should be made available that allow educators to integrate this element into their existing curricula. Model curriculum is needed to teach the principles of emergency alert and warning, including appropriate responses, in our schools. The curriculum should be developed at the county or school board level in order to most accurately reflect local warning procedures and protocols. Private and faith-based schools should also have access to such materials to strongly encourage that the subject is addressed there as well. School emergency plans and procedures should also incorporate how alerts and warnings will be received and transmitted.

5.11 Integration of Warning with Emergency Public Information Systems and Information Resources

As indicated in Section 3.3, there is a need to follow-up warnings with emergency public information to provide supplemental/updated information on the event that triggered the warning. As noted

in Section 5.3.3, most recipients will seek corroboration of a warning message before taking action. Plans, procedures, and protocols should be in place to accommodate both of these demands for information in such a way that the 9-1-1 system is not overloaded.. It should be noted that the content and process for distributing incident-specific public information and pre-incident public education are distinctly different.

1. Linking alerts and public information

Procedures and protocols for implementing the alert and warning system should address the need to follow-up alerts with emergency public information to provide supplemental/updated information and articulate the transition from "warning" to emergency public information.

It's important to keep in mind that there is a difference between "alert" and "information." Optimally, an alert and warning system would incorporate an interactive "feedback loop" that would allow the message sender to validate that the message has been correctly interpreted and the message receiver to corroborate the warning message and obtain further information. However, there is also a need to be cognizant that an interactive system will potentially clog phone systems, so corroboration calls should be efficient in dissemination and duration. Also, it is critical that both warning messages and subsequent emergency public information clearly state the area impacted by the warning/event. This is particularly critical for events occurring in large media markets where only a portion of the area is impacted.

Procedures regarding issuance of warning messages must include cross notification to elements of the emergency response organization where message recipients may turn for information. This includes 9-1-1 dispatchers (to whom the public will turn, even if efforts are made to discourage this potential overload) and local 2-1-1 or 3-1-1 systems if such systems are active locally. The role of 2-1-1 systems, in particular, as a source for corroborating information was discussed. Its potential should continue to be evaluated as the system continues to roll-out across the state. At this time, most of rural California does not have active 2-1-1 systems and not all of the active systems are fully operational on a 24-hour basis. In a large scale alerting situation, 2-1-1 mutual aid may also be needed to increase capacity.

The system must anticipate a range of responses to alert and warning messages – some of those hearing the warning will do strange things, some will do nothing, and some that didn't need to do anything will respond.

2. Families of first responders

Provision of warning information, to the families of first responders is a unique subset of "the public". This communication needs to be interactive – both to the families and feed-back to the responders that their families have received the warning and are taking appropriate action. Agencies with emergency response functions may want to consider establishing an ombudsman position, family "telephone trees", a call-in center or other central point of contact, website messaging, or other means for facilitating communication between responders and their loved ones.

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6 Recommendations

As a result of the issue identification outlined in the prior sections, the AWWG makes the following recommendations regarding the Statewide Alert and Warning System:

6.1 Structuring California's Statewide Alert and Warning System

1. The Statewide Alert and Warning System must be consistent with the Common Alerting Protocol (CAP) as this is essential in assuring interoperability, ensuring adaptability to new technologies, and creating a "system of systems".

2. California's Statewide Alert and Warning System should be a standardized structure that is implemented locally. The state should maintain the statewide alert and warning system structure. Local agencies should be responsible for maintenance of their systems that tie into the statewide public warning system.

3. California's Emergency Digital information Service (EDIS) should be used as the backbone of the Statewide Alert and Warning System including the integration of EDIS into the Alert Aggregator function.

4. The Governor's Office of Emergency Services (OES, as of January 1, 2009 the California Emergency Management Agency)] should be given the responsibility and budgetary support necessary to maintain and manage EDIS, including necessary upgrades to maintain consistency with emerging federal alert and warning initiatives.

5. Although CMAS, the Federal cellular notification system initiative, has not been fully implemented, the State should not develop its own cellular notification system in the mean time but should actively participate in CMAS' further development and integrating EDIS into the CMAS aggregation architecture.

6. The Statewide Alert and Warning System should be clearly explained in the State Emergency Plan.

6.2 System Governance and Maintenance

1. The California Public/Private Partnership for Alert and Warning (Partnership) should be created as the basis of a formal governance structure for the Statewide Alert and Warning System. The objective of the Partnership should be ongoing support of and accountability for a seamless, integrated standards-based public warning capability. Membership must include local and state agencies, representatives of all types of commercial communications networks, and disability community representatives.

2. Common "standards of practice", both for when warnings are issued and how they are issued, should be developed.

3. Procedures and protocols for coordinating and reconciling alerts and warnings that impact multiple local jurisdictions should be developed.

6.3 Crafting the Warning Message

1. Templates should be developed for common warning situations and should be based on academic research on successful warning messages.

2. Message templates should be crafted or translated to meet the particular needs of California's diverse populations to the extent feasible.

3. Minimum performance standards for automated translation technology should be defined.

6.4 Alert and Warning Technology

1. The Statewide Alert and Warning System must be able to deliver a single message to various recipients through various media. These various media must be virtually equivalent to each other from the message input perspective (i.e. "plug and play"), while acknowledging the technical characteristics and limitations of the various media, so that the operational processes for the message issuer do not change whether the message is sent to mobile devices, computers, wireline phones, or whatever communications technologies arise in the future.

2. The alert and warning system adopted by the state must be flexible enough to adapt to, not preclude, future changes. System governance must include on-going evaluation and continuous improvement.

3. Similarly, the alert and warning system adopted by the state must be flexible enough to adapt to various alert and warning technologies already in use by local government.

4. The alert and warning system should strive to reach all phones and devices that are in use by humans within a particular area at the particular time the warning is issued, whether wired or wireless and without regard to the area code of the number, and without resulting in significant impacts to the telecommunications infrastructure (i.e., ability to make 9-1-1 calls).

5. Ability to obtain proprietary information on mobile, VoIP, and other non-landline personal devices may be needed but must be obtained in such a way as to protect companies and customers against unauthorized system access or use of customer data. This may require federal action.

6. The Statewide Alert and Warning System must incorporate redundancy to reach different recipient groups under various emergency scenarios.

6.5 Alert and Warning Accessibility

1. Sensory disability learning preference research needs to be built into alert and warning system solutions that can take a single message and translate it accurately to multiple methods of communication used by people with disabilities.

2. Agencies procuring local warning systems need to test them, through an inclusive process of the diverse disability groups, for this access prior to any commitment to purchase vendor products or services. Standards or guidelines should also be developed to assist communities with this assessment.

6.6 Legal/Liability

1. There is a need for "Good Samaritan" protection for those that issue or relay or provide the network to deliver a legitimate warning. Communications carriers distributing a warning from an authorized government representative to the public in the impact area must be protected from liability. However, liability limitations for all parties issuing and delivering alert and warning messages must be contingent on compliance with operational standards.

2. The governance structure should provide tools for local agencies' use in evaluating, procuring, and implementing emergency notification vendor products.

6.7 Funding

1. A secure, dedicated source of funding is required for EDIS and to support the governance system.

6.8 Evaluation

1. Standards, guidelines, or targets for various elements of the warning system should be established where they do not currently exist.

2. A process should be established to gather and evaluate information on use of the Statewide Alert and Warning System and use that information for continuous system improvement.

3. Standards should be set for testing of alerting and warning systems.

6.9 Training, Credentialing, and Identity Management

1. Standardized alert and warning training tied to and consistent with SEMS and NIMS should be developed. Training needs to address creation of the message as well as use of the system, and should include provisions for periodic refresher training.

2. Standards or guidelines should be developed for identification, validation, and credentialing of authorized alert and warning system users (message originators and distributors).

6.10 Public Education

1. An effective public education campaign that reaches all communities including our most vulnerable population – including the what, where, when, who, why, and how alerts are issued, the limits of public warning capabilities and appropriate responses to warning messages – should be part of the Statewide Alert and Warning System.

2. Training on alerts and warnings (and on emergency preparedness in general) should be required in schools at all levels and materials should be made available that allow educators to integrate this element into their existing curricula. Material should be locally developed to most accurately reflect local warning procedures.

3. Public education efforts should promote realistic expectations about post-event communications, including the importance of using telephones (landline and wireless) only for essential calls.

6.11 Integration of Warning with Emergency Public Information Systems and Information Resources

1. Procedures and protocols for implementing the alert and warning system should address the need to follow-up alerts with emergency public information to provide supplemental/updated information and articulate the transition from "warning" to emergency public information.

2. Guidelines for provision of warning information to the families of first responders should be developed and should emphasize interactive communication – both to the families and feed-back to the responders that their families have received the warning and are taking appropriate action.

AB 2231 Requirement [G.C. 8593.6(c)]	Related Recommendations	
	Section #	Topic
Private and public programs, including pilot projects that attempt to integrate a public-private partnership to expand an alert system	6.1.2 6.2.1	EDIS Partnership
Protocols, including formats, source or originator identification, threat severity, hazard description, and response requirements or recommendations, for alerts to be transmitted via an alert system that ensures that alerts are capable of being utilized across the broadest variety of communication technologies, at state and local levels	6.1.2 6.1.2 6.3.1 6.3.2 6.4.1 6.4.4 6.4.6	EDIS Standards of Practice Message Template Message translation "Plug and Play" Goal to reach all devices in area Redundancy
Protocols and guidelines to prioritize assurance of the greatest level of interoperability for first responders and families of first responders	6.11.2	Interactive communication guidelines
Procedures for verifying, initiating, modifying, and canceling alerts transmitted via an alert system	6.1.2 6.4.2	EDIS Authentication
Guidelines for the technical capabilities of an alert system	6.4	All recommendation in that section relate to technical capabilities
Guidelines for technical capability that provides for the priority transmission of alerts		
Guidelines for other capabilities of an alert system	6.5 6.10.1	Accessibility Public Education
Standards for equipment and technologies used by an alert system	6.4.1 6.4.3 6.4.4	"Plug and Play" Local system compatibility Goal to reach all devices in area
Cost estimates		Although funding is addressed in 6.7.1 it is premature to address cost estimates
Standards and protocols in accordance with, or in anticipation of, Federal Communications Commission requirements and federal statutes or regulations	6.1.1 6.1.5	CAP compatibility CMAS coordination
Liability issues	6.6.1	"Good Samaritan" and communication provider protection

Report Appendices

1. **Emergency Alert System (EAS) Stations in California**
2. **Emergency Digital Information Service (EDIS) Fact Sheet**
3. **Alert and Warning Work Group Process, Meetings, and Members**
4. **Sample EAS Message Template**
5. **Acronyms**

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Appendix 1: State of California Emergency Alert System (EAS) Stations in California

National Primary (NP) Stations for California

California Primary Entry Point (PEP) Stations

KCBS - San Francisco (primary)
KFWB - Los Angeles (secondary)

California State Primary (SP) Station

KFBK – Sacramento

California Local Area Primary (LP1) Stations

Monitoring assignments stations are detailed out in the Local EAS plan. As the LP designation can change for a variety of reasons, and sometimes rather quickly, always check with the local LECC Chair for current information.

Code County/Local Area Designator LP1 Station

DEL Del Norte KPOD 97.9/1240 Crescent City (Includes Curry County, Oregon KURY 910 / 95.3, Brookings,OR)
HUM Humboldt KINS 980 KWSW 790 Eureka
IMP Imperial KXO 1230 / 107.5 El Centro
INYON Inyo {Eastern/Southern Portion} Attached to Southern NV (KDWN Las Vegas)
INMO Inyo/Mono KBOV 1230 / KIBS 100.7 Bishop
KER Kern (Co-LP1 w/county) KUZZ 550 / 107.9 Bakersfield & KCOES
LAS Lassen Attached to Western NV (KKOH 780 Reno)
LA Los Angeles KFI 640, KNX 1070, KFWB 980 (PEP)
MLA Mendo-Lake Lake & Mendocino Counties KUKI 1400 / 103.3 Ukiah
MDC Modoc KKFT 570 KCNO 94.5 Alturas
MNO Mono {Northern Portion} Attached to NV Plan (KKOH 780 Reno)
MON Monterey Bay Counties of Monterey, San Benito, Santa Cruz KSCO 1080 Santa Cruz
ORG Orange KWVE 107.9 San Clemente
RED Redding Shasta & Trinity Counties KQMS 1400 - KHSA 104.3 Redding
RSB Riverside/San Bernardino in 5 zones:
Zone 1 Inland Empire KFRG 95.1 KXFG 92.9 San Bernardino
Zone 2 Coachella Valley KDES 104.7 Palm Springs
Zone 3 Victor Valley KZXY 102.3 Victorville Apple Valley
Zone 4 Mojave Desert KHWY 98.9 Essex, KHYZ 99.5 Mtn Pass
and KRXV 98.1 Yermo
Zone 5 Hemet San Jacinto KATY 101.3 Idyllwild
SAC Sacramento-Sierra: LP1 Group for all 4 zones KFBK 1530 / KSTE 650 / KGBY 92.5
North Zone Counties of Butte, Glenn, Plumas*, Sierra* & Tehama LP2 KTHU 100.7 Chico
Mid-North Zone Counties of Colusa, Sutter and Yuba LP2 KXCL 103.9 Yuba City
Central Zone Counties of Alpine*, Amador, El Dorado*, Nevada*, Placer*, Sacramento, & Yolo LP2 KEDR 88.1 Sacramento
South Zone San Joaquin and Calaveras LP2 KSTN 1420 Stockton / KOSO 93.1 Modesto
*(Except portions east of the Sierra Crest: Alpine, El Dorado, Placer, Nevada, Plumas, Sierra which are part of the Western Nevada-Eastern California Operational Area EAS Plan served out of Reno.)

Appendix 4 :SAMPLE EAS MESSAGE FORMULA, SAN LUIS OBISPO COUNTY

Situation + Population + Action = EAS Message

SITUATION +	POPULATION +	ACTION
What is the hazard? *Examples*: Natural disaster Weather warning Hazmat accident Terrorist attack **What is the risk?** *Examples*: Personal (health and safety) Property (residences, business, institutions, infrastructures, etc.) **Where is it?** *Examples*: Nuclear power plant Army Depot Highway, railway, waterway Counties/Regions **When did it/will it occur?**	**Who is at Risk/Where are the people?** *Examples:* Counties, cities, etc. Specific areas, e.g. EPZs recreational areas, etc. Traveling certain routes Combinations of the above **Who are the people?** *Examples*: Everyone Special populations (pregnant women, children, those with respiratory problems, etc.) Combinations of the above	**What does the at-risk population need to do and how?** *Examples*: Evacuate to a specific destination via specific routes Shelter-in-place, explain **When does this action need to be taken?** **Who is urging this action?** *Examples*: Governor, EMA Officials, etc. **Reference educational materials.** **Stay tuned for further information.**

Repeat message.

Provide updates

Source: San Luis Obispo County Nuclear Power Plant Public Information Officer Standard Operating Procedure

Appendix 3: The Work Group Process

The work group process specified in AB 2231 was initiated in March 2008 with the first meeting of the Alert and Warning Working Group (AWWG) held on March 27, 2008. This "kick-off" meeting was the first in a series of meetings to implement the provisions of AB 2231 regarding enhancing alert and warning notification systems in California through public-private partnerships. The workshop focused on obtaining initial information to support AB 2231 implementation, identification of key stakeholders and interested parties, and outlining the process for implementing the project over the next year. This meeting built upon issues initially identified at two Workshops for California Emergency Alerts held in August 2007, sponsored by the Lieutenant Governor, OES and the CPUC. Subsequent AWWG meetings expanded and extended the work begun in March 2008. These meetings were held June 24, 2008; September 18, 2008 and December 2008. Summaries of the work group and work team meetings are included in this Appendix.

Composition of the AWWG and the work teams emphasized the public-private partnership nature of the alert and warning process. Representatives of many aspects of the communications industry, state and local government, and special needs populations actively participated in the AWWG and all of the work teams. A listing of work group and work team participants is included in this Appendix.

At the March 2008 meeting the participants also expanded stakeholder participation from that formally specified in AB 2231 and identified the need to establish subcommittees ("work teams") to address key areas. Five "work teams" were identified: (1) Technical Issues, (2) Social Issues, (3) Standardization, (4) Funding, and (5) Legal and Liability Issues. Subsequent to this initial identification of focus areas, it was suggested that the last two (Funding and Legal and Liability) issues be merged for purposes of the initial issues identification. Several of the work teams discovered that they had overlapping areas of interest. The issues identified by the work teams have been combined in to common issue areas for the purposes of this report. The work teams began meeting in May 2008. The process used by the work teams was generally similar. Each initial team meeting involved review of some preliminary information from the members regarding potential priority issues and other discussion areas. As a result of these meetings:

- Some items were removed from the particular work team's area of responsibility;
- Priority items were identified;
- The work teams began initial issue recommendation development; and
- Cross-cutting issues were identified that required joint work with other work teams

Throughout the process, particular emphasis was placed on stakeholder involvement, at all levels of government, with the private sector (including vendors) and key nongovernmental organizations.

Technical Issues Work Group

The Technical Issues work group agreed it should focus on issues at a policy level. For the report to the Legislature the group agreed it is important to identify the current status of alert and warning technology in California and then determine the direction in which the state needs to go.

There was general agreement that alerts and warnings are transmitted to multiple existing delivery systems which were not developed with alert and warning as a primary function. There has not yet been an effort to coordinate these into an integrated system. Industry will play a huge role in the process of further developing the statewide alert and warning system or system of systems, and if the industry is driving the technology, it is important that those representatives are heavily engaged in the work teams' effort. However, the state's alert and warning system should not be technology driven but user driven; users should decide what the system is to accomplish and technology should be identified to support this.

The work group began with the overall general assumption that whatever alert and warning system solutions are implemented, they must be consistent with the Common Alerting Protocol (CAP).

Social Issues Work Group

At its initial meeting, the group reviewed a presentation prepared by Drs. Dennis Mileti and Erika Kuligowski of the University of Colorado on "Public Warning and Response"; this presentation summarized currently accepted findings regarding the nature of public warning and the public's reaction to them. Several key findings from that presentation were subsequently included in the team's issue discussions and recommendations. The group also addressed the social benefit of public warning.

Standardization Work Group

The work group generally discussed application of national and international standards at the state level, what we will need to put in place in order to facilitate this, and the need to be consistent in the use of terminology.

Legal, Liability and Funding Issues Work Group

This work group was the last to meet and addressed issues referred to it by other work groups and identified at the June work group meeting. The group focused on current law surrounding alert and warning and any perceived shortfalls.

Technical Issues Work Group Meeting Summary

July 24, 2008, Alert and Warning Technological Issues Meeting Summary

The July 24, 2008, Alert and Warning Technological Issues meeting focused on the topic of Assembly Bill 2231 (Pavley, Government Code Section 8593.6) recommending national and international standards at the state level, specifically California. This discussion is reflected as written documentation and the discussion was recorded as meeting minutes. Objectives of the meeting were refinement of the technical issues section of draft report to the legislature and assignments toward next steps. Specifically the topic of Emergency Digital Information Service was addressed in detail. A complete copy of the meeting minutes can be obtained from the Office of Emergency Services Web site at www.oes.ca.gov.
(see appendix for meeting attendee listing)

Social Issues Work Group Meeting Summary

July 31, 2008, Alert and Warning Social Issues Meeting Summary

The July 31, 2008, Alert and Warning Social Issues meeting focused on the topic of AB 2231 (Pavley, Government Code Section 8593.6) recommending national and international standards at the state level, specifically California. This discussion is reflected as written documentation and the discussion was recorded as meeting minutes dated July 31, 2008. A copy of this documentation is available on the Office of Emergency Services Web site at www.oes.ca.gov. The meeting focused on: human behavior/recipient reaction; message content/template development; social benefit of duty to warn; translation and accessibility of the message; and signal and warning methods and options.

Standardization Work Group Meeting Summaries

July 15, 2008 Alert and Warning Standardization Meeting Summary

The July 15, 2008, Alert and Warning Standardization meeting focused on the topic of Assembly Bill 2231 (Pavley, Government Code Section 8593.6) recommending national and international standards at the state level, specifically California. This discussion is reflected as written documentation and the discussion was recorded as meeting minutes. Objectives of the meeting were to gather priority issues, prioritize issues, draft

a work plan, and conclude by beginning the process for drafting a report to the California legislature. A complete copy of the meeting minutes can be obtained from the Office of Emergency Services Web site at www.oes.ca.gov.

August 13, 2008 Alert and Warning Standardization Meeting Summary

The August 13, 2008, Alert and Warning Standardization meeting focused on the topic of AB 2231 (Pavley, Government Code Section 8593.6) recommending national and international standards at the state level, specifically California. This discussion is reflected as written documentation and the discussion was recorded as "tracked changes" in the draft report to the legislature dated August 13, 2008. A copy of this documentation is available on the Office of Emergency Services Web site at www.oes.ca.gov. The copy of the draft to the legislature includes input from the meeting attendees. The standardization section is divided into seven issue sections. The following four issue areas were edited based on recommendations from group members: Professional Standards of Practice; Metrics and Evaluation; Vertical/Horizontal Integration and Coordination; Access to Delivery Information. (see draft report to legislature for compiled draft changes)

Legal/Liability and Funding Issues Work Group Meeting Summary

August 21, 2008, Alert and Warning Legal/Liability/Funding Meeting Summary

The August 21, 2008, Alert and Warning Legal/Liability/Funding meeting focused on the topic of AB 2231 (Pavley, Government Code Section 8593.6) recommending national and international standards at the state level, specifically California. This discussion is reflected as written documentation and the discussion was recorded as "tracked changes" as additions to a meeting agenda dated August 21, 2008. A copy of this documentation is available on the Office of Emergency Services Web site at www.oes.ca.gov. The copy of the meeting agenda includes input from meeting attendees. The meeting focused on: barriers/inconsistencies/challenges and new developments regarding alert and warning.

All Issues Work Group Meeting Summary

August 22, 2008, Alert and Warning All Issues Meeting Summary

The August 21, 2008, Alert and Warning All Issues meeting focused on the topic of AB 2231 (Pavley, Government Code Section 8593.6) recommending national and international standards at the state level, specifically California. This discussion is reflected as written documentation and the discussion was recorded as meeting minutes dated August 22, 2008. A copy of this documentation is available on the Office of Emergency Services Web site at www.oes.ca.gov. The meeting focused on: Diffusion of the Message; "Who" Delivers the Message (Trust); Managing Public Expectations; and Social Benefit of Duty to Warn.

Technical Issues Work Group Members	
Alvarez, Michael	Dept. of Indust. Relations
Botterell, Art	
Brown, George	San Luis Obispo County
Candelaria, Jerome	California Cable and Telecommunication Association
Casciato, Peter	
Cheema, Preet	Yuba Community College Police Department
Daly, Brian	AT & T
DeBeaux, John	CESA
Dedo, John	Independent Party
Dizmang, Sue	CFCA North
Flague, Al	MLI Power
Gabbert, Jim	SECC
Green, Ben	
Greer, Michael	California Public Utilities Commission
Ince, Roger	Office of Emergency Services; Sacramento
Jimenez, Orlando	Lang. World Services
Kaufman, Angela	Los Angeles Dept. on Disability
Litkouhi, Simin	California Public Utilities Commission
Musgrove, Peter	AT&T
Nebenzahl, Scott	Seismic Warning Systems, Inc.
Ortega, Dan	
Pachikara, Jim	California Public Utilities Commission
Petel, Efraim	Hormann America, Inc.
Prigozen, Lisa	California Public Utilities Commission
Rowlett, Maria	Verizon
Rudman, Richard	SECC
Saroyan, Jason	Waterfall Mobile
Sieracki, Paul	Sprint/Nextel
Simpson, Margot	
Sirney, Jason	Sacramento Fire Department
Webb, William	Coalinga State Hospital
Whitten, Julie	California Department of Public Health
Wilkinson, Christopher	Yuba Community College Police Department
Xiaomei Wang	Verizon, Network Technology
Zolfarelli, Jeff	Livermore Fire Dept.
Zuniga, Helen	Citrus Heights Police Department

Social Issues Work Group Members	
Allen, Betty	
Brown, Michael	Department of Mental Health
Business, Transportation, & Housing	
Bussard, Debbie	Office of Emergency Service
De Jong, Mary Liz	AT&T
DeCrescenzo, Joan	Department of General Services
Dedo, John	Independent Party
Devylder, Richard	Office of Emergency Service
Jimenez, Orlando	Language World Services
Kaufman, Angela	LA Department on Disability
Larry Rillera	State Seismic Safety Committee
Leslie Luke	County of San Diego
Litkouhi, Simin	California Public Utilities Commission
Lucus, Val	UC Davis
Nebenzahl, Scott	Seismic Warning Systems, Inc.
Pachikara, Jim	California Public Utilities Commission
Porter, Jamie	CDSS
Simpson, Margot	
Van Wambeke, Eric	California Public Utilities Commission
White, Phyllis	California Public Utilities Commission
Wilkinson, Christopher	Yuba Community College Police Department
Zolfarelli, Jeff	Livermore Fire Dept.
Zuniga, Helen	Citrus Heights Police Department
Standardization	
Botterell, Art	Contra Costa County Office of the Sheriff
Brown, George	San Luis Obispo County
Brown, Mike	Business, Transportation, and Housing
Carlson, Steve	CTIA—The Wireless Assoc
De Jong, Mary Liz	AT&T
DeCrescenzo, Joan	Department of General Services
Dizmang, Sue	CFCA North
Flague, Al	MLI Power
Gabbert, Jim	SECC
Garton, Dennis	Tehama Co. Sheriff Office
Greer, Michael	California Public Utilities Office
Ince, Roger	Office of Emergency Services; Sacramento
Jimenez, Orlando	Language World Services

Kaufman, Angela	LA Department on Disability
Litkouhi, Simin	California Public Utilities
Lucus, Val	UC Davis
Pachikara, Jim	California Public Utilities
Prigozen, Lisa	California Public Utilities
Rudman, Richard	SECC
Sirney, Jason	Sacramento Fire Department
Van Miller, Phillip	United Calling Network
Van Wambeke, Eric	California Public Utilities
White, Phyllis	California Public Utilities
Wilkinson, Christopher	Yuba Community College Police Department
Xiaomei Wang	Verizon; Network Technology
Younce, Christian	T-Mobile
Zolfarelli, Jeff	Livermore Fire Department
Zuniga, Helen	Citrus Heights Police Department
Legal. Liability and Funding	
Botterell, Art	Contra Costa County Office of the Sheriff
Brown, George	San Luis Obispo County
Brown, Mike	Business, Transportation and Housing Agency
Carlson, Steve	CTIA—The Wireless Assoc
De Jong, Mary Liz	AT&T
DeBeaux, John	CESA
Dedo, John	Independent Party
Furtado, Dan	League of California Cities
Johnson, Dorothy	League of California Cities
Litkouhi, Simin	California Public Utilities Commission
Pachikara, Jim	California Public Utilities Commission
Prigozen, Lisa	California Public Utilities Commission
Roberts, Lauren	Disability Rights Advocates
Rudman, Richard	SECC
White, Phyllis	California Public Utilities Commission

Complete Listing of Alert and Warning Work Group Members, Stakeholders, and Executive Members

Aflague, Al	MLI Power
Alsop, Ron	San Luis Obispo County
Allen, Betty	DMHC
Alvarez, Michael	Dept. of Indust. Relations
Boland, Don (Statutory Member)	California Utility Emergency Association
Botterell, Art	Contra Costa County Office of the Sheriff
Brooks, Michael (Statutory Member)	L.A. County Office of Emergency Services
Brown, George	San Luis Obispo County
Brown, Mike	\ California Business, Transportation, and Housing Agency
Bussard, Debbie	Governor's Office of Emergency Services
Candelaria, Jerome	California Cable and Telecommunications Association.
Carlson, Steve	CTIA—The Wireless Assoc
Casciato, Peter	
Cheema, Preet	Yuba Community College Police Department
Daly, Brian	AT&T
De Jong, Mary Liz	AT&T
DeBeaux, John (Statutory Member)	California Emergency Services Association
DeCrescenzo, Joan	California Department of General Services – Telecommunications Division
Dedo, John	Independent
Devylder, Richard (Statutory Member)	Governor's Office of Emergency Services
Dizmang, Sue	CFCA North
Eplett, Robert	Governor's Office of Emergency Services
Flague, Al	MLI Power
Ferrara, Tony (Statutory Member)	Local Government
Furtado, Dan	League of California Cities
Henry-Gorman, Kathlene	Independent
Hill, Dr. Lopez	Akweeh Network, Inc.
Gabbert, Jim	SECC
Garton, Dennis	Tehama County Sheriff Office
Gunther-Allen, Janette	Department of Justice
Green, Ben	
Greer, Michael	California Public Utilities Commission
Ince, Roger	Sacramento Office of Emergency Services
Jimenez, Orlando	Language World Services
Johnson, Dorothy	League of California Cities
Kaufman, Angela	Los Angeles County Department on Disability
Kasnitz, Melissa	Disability Rights Advocates

Keene, Karen (Stat Member)	California State Assoc of Counties
Luke, Leslie	County of San Diego (OES)
Litkouhi, Simin	California Public Utilities Commission
Lucus, Val	University of California, Davis
Musgrove, Peter	AT&T
Nebenzahl, Scott	Seismic Warning Systems, Inc.
Ortega, Dan	
Pachikara, Jim	California Public Utilities Commission
Petel, Efraim	Hormann America, Inc.
Petel, Tomer	Hormann America, Inc.
Porter, Jamie	California Department of Social Services
Prigozen, Lisa	California Public Utilities Commission
Rillera, Larry	State Seismic Safety Committee
Roberts, Lauren	Disability Rights Advocates
Rowlett, Maria	Verizon
Rudman, Richard	SECC
Samaan, Robert (Statutory Member)	Governor's Office of Homeland Security
Saroyan, Jason	Waterfall Mobile
Schulley, Randy	Governor's Office of Emergency Services
Sieracki, Paul	Sprint/Nextel
Simpson, Margot	
Sirney, Jason	Sacramento Fire Department
Statham, Stan (Statutory Member)	Broadcaster's Association
Taylor, Edward	Hallmark Investments
Van Miller, Phillip	United Calling Network
Van Wambeke, Eric	California Public Utilities Commission
Xiaomei Wang	Network Technology, Verizon
Webb, William	Coalinga State Hospital
White, Phyllis	California Public Utilities Commission
Whitten, Julie	California Department of Public Health

Appendix 5: Acronyms Used in This Report

AMBER	America's Missing Broadcast Emergency Response
AWWG	Alert and Warning Work Group
CAP	Common Alerting Protocol
CMAS	Commercial Mobile Alert System
CMS	Commercial Mobile Service
CPUC	California Public Utilities Commission
EAS	Emergency Alert System
EDIS	Emergency Digital Information Service
ESA	Emergency Services Act
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
K-12	Kindergarten through Twelfth Grades
IPAWS	Integrated Public Alert and Warning System
NIMS	National Incident Management System
NOAA	National Oceanic and Atmospheric Administration
OES	Governor's Office of Emergency Services
SEMS	Standardized Emergency Management System
TTY	Telephone typewriter
VoIP	Voice over Internet Provider
WARN	Warning Alert Response Network Act